PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	Halladay, et al.	**Docket No.:**	IR-2970(AA)
Serial No.:	09/997,443	**File Date:**	11/30/2001
Examiner:	Ramsey E. Zacharia	**Art Unit:**	1773
For:	"Room-Temperature Curable Fluoropolymer Coating"		

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February 4, 2004

Assistant Commissioner for Patents
Mail Stop Fee Amendment
PO Box 1450
Alexandria, VA 22313-1450

REPLY

Sir:

This Reply is in response to the Office Action dated 08-05-2003. Authorization to deduct the fee for a petition for extension of time accompanies this reply. Non-elected claims are canceled. New claim 23 is added as claim 2 combined with amended claim 1. Reconsideration of all pending claims is respectfully requested. Remarks follow the same numbered paragraphs, e.g., 7 of the Office action corresponds to 7R herein.

(4-R) Claims 1, 3-7, and 11-14 were rejected under 35 USC 112, 2nd parag. as indefinite. The "two parts" terminology was not clear to the Office. Claim 1 is amended to be consistent with support on page 5, last sentence of parag. 005, with text reprinted:

" The graft-modified fluoroelastomer is combined with the curing agent in admixture, within the time of the pot life (prior to gellation) of the admixture, prior to the time of coating the elastomer substrate."

(5-R) Claims 3-7 were rejected under 35 USC 112, 2nd parag. regarding curing agents lacking hydroxyl groups (claim 1) in some instances. This is rendered

moot by amendment to Claim 1 to recite the grafting agent features consistent with the following text on page 5, specification, first sentence of parag. 16:

"a grafting agent which contains a graft linking group which covalently bonds to the fluoroelastomer, and at least one active hydrogen-containing group, e.g., hydroxyl, thiol, or carboxyl group that undergoes bond formation to one of the reactive groups of the curing agent."

Claim 1 was further amended to clarify the curing agent contains at least one isocyanate group or a group bearing an isocyanate group that bonds to an active-hydrogen-bearing group on said fluoroelastomer, and a reactive crosslinking group that bonds to another active hydrogen-bearing group of said fluoroelastomer, and consistent with the text on page 8, specification, paragraph 22, reprinted here:

> "The curing agent is a multifunctional component that contains at least two groups which bond to different active hydrogen-bearing groups on the graft-functionalized fluoroelastomer. The preferred curing component contains at least one isocyanate group or a group bearing an isocyanate group, and a reactive crosslinking group that bonds to another active hydrogen-bearing group of the fluoroelastomer to form a chemical crosslink."

(6-R) With regard to claim 1, a question of hydroxyl reactive crosslinking group (on the curing agent)- this is moot as amended claim 1 refers to a reactive crosslinking group that bonds to another active hydrogen-bearing group of said fluoroelastomer .

The presence of two isocyanate groups on the curing agent satisfies the functionality requirement. See last sentence of paragraph 22, on page 8, and paragraph 23. The scope for the curing agent encompasses a compound that can contain only one isocyanate group, together with a group other than an isocyanate group that is equally capable of bonding to the "another reactive hydrogen-bearing group" of the fluoroelastomer.

(7-R) Claims 11, 13, and 14 are amended to refer back to the curing agent to

provide proper antecedent basis.

(10-R) Claims 1, 8, 10 and 16 were rejected under 35 USC 103(a) as unpatentable over Hanada (US '042). Applicants referred to this patent in paragraph 4 of the specification however they note an amendment is needed to correct the typographical error in the patent number. Hanada teach the following with respect to fluoropolymers at Col. 9, lines 58 - Col. 10, line3:

"As the fluoropolymer used as a film-forming resin and modified with the above silane coupling agent and a specific reaction product, various fluoropolymers have been put on the market. Any fluoropolymers available from the market can be used as long as they contain a group reactive with an isocyanate group and, in addition, is soluble in the solvent.

Examples of suitable fluoropolymers include copolymers of fluorine-containing olefin monomers, such as tetrafluoroethylene and trifluorochloroethylene, and monomers containing one or more functional groups reactive with an isocyanate group, such as hydroxyl, carboxyl, amino and epoxy groups. Typical examples of these copolymerizable monomers include various alkyl vinyl ethers."

Fluoropolymers comprising tetrafluoroethylene and trifluorochloroethylene alone, or with alkyl vinyl ether comonomers are fluoroplastics. The working examples in this patent utilized LUMIFLON® fluoro-olefin-vinyl ether copolymers. Reference product data on LUMIFLON is found at http://www.bellexinternational.com/lumiflon.htm.

This fluoroplastic was reacted with an isocyanatosilane coupling agent. The reacted polymer was a single part, moisture curable coating was applied to steel panels and the performance of coatings was evaluated in terms of stain resistance, gloss and water repellency.

Applicants claims are distinguished over the fluoroplastic coatings of Hanada et al on the basis that:

(1) A fluoroelastomer is used, not a fluoroplastic. The specification teaches the difference between a fluoroplastic and a fluoroelastomer on page 4, paragraph 13.

(2) In forming a graft reaction product of the fluoroelastomer of the claimed invention, grafting is made via a primary amine group, as opposed to an isocyanate group. Detailed discuusion is below.

> (3) In the claimed invention, the primary amine graft-linked elastomer is cured with the second part of the mixture by an external curing agent whereas in Hanada, et al there is no external curing agent used. Hanada suggests optionally using reaction products of polyisocyanate with polysiloxanes or fluorine compounds, however graft linking is the same. The Office references in Hanada et al, relating to a grafting agent all graft via isocyanate groups. Hanada uses a reaction product of aminosilane, epoxysilane, polysiloxane oil or fluorine compounds , etc. with polyisocyanate. (See Col. 7, lines 13, 14, and lines 24, 25) Such a grafting agent products bear no primary amine, because isocyanate is used in excess. Such grafting agents are not aminosilanes. Since grafting occurs in Hanada by way of isocyanate, not primary amine, Hanada et al do not suggest the claimed amine graft-modified fluoroelastomer element of the coating.

(4) Hanada, et al in teaching polysiloxane or fluorine compounds do not provide, teach or suggest a curing agent. The modified fluoroplastic cures by itself in the presence of moisture. See col. 10, line 40 - 44, reprinted here:

"When the coating composition of the present invention is brought into contact with moisture in the air, water, steam or the like, the silanol groups thereof cause a corsslinking reaction, leading to the curing of the composition."

The modified fluoroplastics of Hanada et al cure by themselves, as noted above. In Applicants' invention according to claim 1, the coating mixture incorporates as the second part, an external curing agent that contains (a) and (b) where (a) is an isocyanate group or a group bearing an isocyanate group that bonds to an active-hydrogen- bearing group of the fluoroelastomer, and (b) is a reactive crosslinking group that bonds to another active hydrogen-

bearing group of said fluoroelastomer. Although at Column 10, lines 18 - 39 in Hanada et al, polymers other than fluoroplastic are suggested in blends therewith, none of the polymers resemble the claimed curing agent in any respect. Whereas Hanada et al graft modified-fluoroplastic cures by itself, there is no need to increase cost and complexity by following a different grafting route that works in conjuncton with an external curing agent. Another route for graft-modifying the fluoropolymer was indeed not enabled in the Hanada et al disclosure Applicants' elastomeric coating is particularly adapted to tenaciously adhere to elastomer substrates, and allow a high degree of flex-resistance without loss of adhesion. These features are provided by the essential coating components combined in the manner claimed. The curing agent is essential in crossbonding reactions.

With respect to claim 8, which recites the use of a grafting agent which comprises one ethylenic unsaturated group and one active hydrogen group, Hanada et al do not teach or suggest such coupling agents. Furthermore, as in claim 8, a curing agent in the second part comprising a di- or polyisocyanate curing component is not taught nor suggestive from Hanada et al.

Whereas, in order to render the claimed invention unpatentable under 35 USC 1203(a), each and every element of the claimed invention as a whole must be taught or suggestive from the prior art, and the above showing established that such has not been shown with respect to Hanada et al, U.S. Pat. No. 5,621,042. Applicants respectfully request that legally cognizable grounds for withdrawal of the rejection have been presented.

(11-R) Rebuttal as to motivation to modify.

(1) From the nature of the problem solved.

Hanada et al, refer to avoidance of external curing agents like melamines or isocyanates which require heating, and can provide inferior curing. (Col. 1, lines 44-54).

(2) From the teachings of the prior art.

Different grafted fluoroplastics, not utilizing an external curing agent are taught. The curing agents mentioned as part of the prior art are distinguished from the curing agent used in the claimed invention.

(3) The knowledge of persons of ordinary skill.

Enabling information as to (1) the type of graft route to functionalize a fluoroelastomer, and (2) curing of the so-modified fluoroelastomer using the type of curing agents specified was not provided individually or combined as a whole.

The person with ordinary skill in the art can not form any reasonable expectation of success unless the subject matter of the claimed invention is suggested to that person or that which would be followed according to her knowledge or by reference to enabling disclosures, both of which were not established by the Office. Reconstructing a comonomer containing amino and hydroxyl functionality as suggested on page 6, in view of the teachings, is necessarily derived from hindsight reconstruction and is nonenabled when separated from Applicants' own disclosure.

The claims are believed to be in condition for allowance, and such is earnestly solicited.

Respectfully submitted,

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CERTIFICATE OF MAILING (37 CFR 1.8(A))

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on Feb. 04, 2004 with sufficient postage as first class mail in an envelope addressed to the Assistant Commissioner of Patents, Mail Stop Fee Amendment, PO Box 1450, Alexandria, VA 22313-1450.

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2/4/04

Date